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STATE-OF-THE-ART PAPER

The appearance of cognitive dysfunction after cardiac surgery in the absence of focal neurologic signs is a poorly understood but potentially devastating complication. Confirmation of the occurrence of peri-operative "silent brain injury" has been developed through advances in magnetic resonance imaging (MRI) techniques, which detect new brain lesions in 25% to 50% of patients after either coronary artery bypass graft or valve surgery. However, quantifying new cognitive dysfunction is difficult because of the need for extensive pre- and post-operative testing, which is subject to ascertainment bias. Sun and colleagues argue that the post-operative appearance of MRI lesions would serve as a more objective marker of brain injury in research efforts.

CLINICAL RESEARCH

Palmerini and colleagues performed a meta-analysis of 19 trials in which 10,944 patients were randomized to coronary artery bypass graft (CABG) surgery or percutaneous coronary intervention (PCI) to determine whether there are differences in the rate of peri-procedural stroke. The 30-day rate of stroke was 1.20% after CABG compared to 0.34% after PCI (odds ratio [OR]: 2.94). Similar results were observed after a median follow-up of 1 year and were not affected by the extent of coronary artery disease (single-vessel vs. multivessel vs. left main). This meta-analysis confirms that patients treated with CABG have a significantly higher risk of stroke than those treated with PCI, with an excess of 7 strokes for every 1,000 patients treated.

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ACUTE CORONARY SYNDROMES

Pre-hospital electrocardiography (PH ECG) decreases door-to balloon (D2B) time for ST-segment elevation myocardial infarction (STEMI) patients; however, obtaining a PH ECG may prolong the time the paramedics are at the scene. Patel and colleagues investigated the impact of obtaining a PH ECG on both scene and transport times for patients with chest pain suspected of cardiac origin. Implementation of PH ECG resulted in minimal increases in median scene time (19:10 min:s vs. 19:28 min:s) and transport time (13:16 min:s vs. 13:28 min:s). However, compared to chest pain patients, STEMI patients had shorter scene time (17:51 min:s vs. 19:31 min:s) and transport time (12:34 min:s vs. 13:31 min:s). Obtaining a PH ECG for patients with chest pain minimally prolongs scene and transport times, but may expedite transit times for those identified as a STEMI.

Editorial Comment: Umesh N. Khot, p. 812

ACUTE CORONARY SYNDROMES

Ranthe and colleagues used the integrated databases of the Danish Health Care System to study the risks associated with a family history of premature death (<60 years of age), cardiovascular death in particular. The incident rate ratios (IRRs) for any early (<50 years of age) cardiovascular disease, ischemic heart disease, or ventricular arrhythmia, given a history of premature cardiovascular death in 1 first-degree relative were approximately 2.00. If there were ≥2 cardiovascular deaths in a family, the rates were doubled again. Family history of premature cardiovascular death was consistently and significantly associated with risk of early cardiovascular disease.

HEART FAILURE: VIEWPOINT

While acute heart failure syndromes are commonly defined as a change in chronic heart failure signs and symptoms requiring urgent therapy, the presentation, development, and response to treatment is highly dependent on individual patient characteristics. This heterogeneity has led to challenges in interpreting different study methods, including eligibility requirements and outcome measures. To improve interpretation of results, and translate such information to better patient care, the Standardized Reporting Criteria Working Group and the Emergency Management and Research Group in Acute Heart Failure present standardized reporting criteria to improve interpretability of research in this challenging cohort.

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HEART VALVE DISEASE

In the canine model of isolated mitral regurgitation (MR), chronic β_1-adrenergic receptor (AR) blockade improves cardiomyocyte and left ventricular (LV) function. Ahmed and colleagues randomized 38 asymptomatic subjects with moderate to severe MR to either placebo or β_1-AR blockade. Magnetic resonance imaging with tissue tagging and 3-dimensional analysis was performed at baseline and at 6-month intervals for 2 years. Significant treatment effects were found on LV ejection fraction and LV early diastolic filling rate, which both worsened in untreated patients but not in those assigned to β_1 blockade. This small trial suggests the need for a larger trial of β_1-AR blockade for patients with isolated MR powered to detect differences in clinical endpoints.

Editorial Comment: Blase A. Carabello, p. 839

HEART RHYTHM DISORDERS

Recent studies have demonstrated a role for *NOS1AP* gene variants in modulating QT interval in healthy subjects and the risk of arrhythmias in subjects with long QT syndrome (LQTS). Jamshidi and colleagues carried out an association study using 167 single nucleotide polymorphism spanning the *NOS1AP* gene in 58 Caucasian patients experiencing drug-induced LQTS (dLQTS) and 87 Caucasian controls. Association analysis identified 1 polymorphism significantly associated with dLQTS (rs10800397), particularly in subjects who experienced dLQTS with amiodarone. These findings were then replicated in an independent cohort. These results provide the first demonstration that common variations in the *NOS1AP* gene are associated with a significant increase in the risk of dLQTS.

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HEART RHYTHM DISORDERS

Munger and colleagues have noted that obesity is associated with an increased risk of atrial fibrillation (AF) and sought to characterize the left atrial (LA) and pulmonary vein (PV) electrophysiologic and hemodynamic features in obese patients with AF. Obese patients had a shorter effective refractory period (ERP) in the LA and PV than normal body mass index patients. Obese patients also had higher mean LA pressure and LA volume index. These are potential factors facilitating and perpetuating AF in obese patients.

ANTITHROMBOTIC THERAPY

Three bleeding risk prediction schemes have been derived and validated in atrial fibrillation (AF) populations: HEMORR$_2$HAGES, ATRIA, and HAS-BLED. Apostolakis and colleagues used data from a large trial to determine the relative predictive value of these bleeding scores for patients treated with adjusted-dose oral vitamin K antagonist (VKA) therapy. The principal safety outcome was 'any clinically relevant bleeding,' which was a composite of 'major bleeding' plus 'clinically relevant non-major bleeding.' The HAS-BLED score performed best in predicting 'any clinically relevant bleeding,' reflected both in net reclassification improvement and receiver-operating characteristic analyses. Given its simplicity and superior performance, the HAS-BLED score appears useful for the estimation of VKA-related bleeding risk in clinical practice.